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ABSTRACT

Two different conceptions of ability are proposed. The first conception of ability is more differentiated and generally employed by adults and older children. Here ability level is defined with reference to the performance of others assuming that optimum effort was employed. High ability means higher than others. The second conception of ability is generally employed by young children and focusses on self-referenced comparisons of performance. High ability is inferred from learning or higher performance than previously displayed. It is proposed that adults use both conceptions of ability. Different situational factors are predicted to promote the adoption of one conception rather than the other leading to different cognitive and affective interpretations of performance. Three studies were conducted to investigate these hypotheses. The results demonstrate that adults generally employ the more differentiated conception of ability and that competitive conditions may foster the more differentiated conception while an intrinsic task interest tends to promote adoption of the less differentiated conception of ability. Finally, when the more differentiated conception was adopted, students anticipated less satisfaction with learning if performance was not superior to all competitors or if effort was higher than others. (Author/PN)

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Conceptions of Ability

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A version of this paper under the title, "Achievement Orientation and Affective Responses to Success," was presented at the Annual Meeting of the American Educational Research Association held in New York, March, 1982.

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Abstract

Two different conceptions of ability are proposed. The first conception of ability is more differentiated and generally employed by adults and older children. Here ability level is defined with reference to the performance of others assuming that optimum effort was employed. High ability means higher than others. The second conception of ability is generally employed by young children and focusses on self-referenced comparisons of performance. High ability is inferred from learning or higher performance than previously displayed.

It is proposed that adults use both conceptions of ability. Different situational factors are predicted to promote the adoption of one conception rather than the other leading to different cognitive and affective interpretations of performance. A series of studies was conducted to investigate these hypotheses. The results demonstrate that adults generally employ the more differentiated conception of ability and that competitive conditions may foster the more differentiated conception while an intrinsic task interest tends to promote adoption of the less differentiated conception of ability. Finally, when the more differentiated conception was adopted, students anticipated less satisfaction with learning if performance was not superior to all competitors or if effort was higher than others than when the less differentiated conception was adopted.

Although much progress has been made in the development of attributional approaches to the study of achievement motivation (Weiner, 1974, 1979), the research in this area has implicitly taken an absolutist position concerning the meaning of factors such as ability and effort for the individual. For example, it is assumed that an attribution of success to ability has the same general meaning and affective significance on all occasions. We propose that there are at least two different ways in which ability can be conceived and that situational factors can cause the individual to adopt one conception or the other. Hence, the significance of an attribution of success to ability would vary with the situation.

Evidence for the existence of two different conceptions of ability is derived from research demonstrating age-related changes in children's conceptions of ability (Nicholls & Miller, in press). Both older and younger children believe that effort leads to gains in mastery or competence. However, only older children can employ the normative conception of ability implicit in intelligence testing practices. According to this conception of ability, one's level of ability is defined with reference to the performance of others. A raw ability test score is not very informative. It must be compared with the performance of a suitable reference group if one is to make an inference concerning ability level. It is further assumed that a valid ability inference demands evidence that optimum effort was employed. Ability will not be revealed

if effort is low. On the other hand, it is implied that effort will increase performance, but only up to the limit of one's ability. That is, ability is conceived as capacity--an underlying trait that is not observed directly but is inferred from both effort and performance in a context of social comparison. When adults and older children believe their ability is low, they believe they lack capacity. This is not the case for young children. For them, low ability means something more like what an adult would see as poor performance or insufficient effort.

For young children, high ability is inferred from learning or from success at tasks they are uncertain of being able to complete. They do not judge ability with reference to performance norms or social comparisons. Normally, young children make self-referenced rather than norm-referenced judgments of ability: High ability means higher performance than before. For young children, improved performance resulting from trying hard is interpreted as evidence of high ability. Thus, effort has quite different implications for adults and young children. For adults, high effort can imply low ability if others require less effort for the same performance. For young children, successes that require more effort imply more learning or greater accomplishment which means more ability.

The perspective of young children could be termed subjective. For them, the subjective experience of gaining insight or mastery through effort is the experience of competence or ability. For the adult, such a gain in mastery could lead to a feeling of

incompetence if, on adopting the more objective viewpoint which the young child lacks, they observe that their peers master more with less effort. Hence, given the more subjective viewpoint of the child, it is more appropriate to refer to feelings of competence or mastery rather than judgments of competence. Improved performance resulting from effort leads to "feelings" of competence and satisfaction with learning as an end in itself. "Judgments" of competence require the more objective viewpoint employed with the differentiated concept of ability. In this case learning serves as a means to the end of performing better than others. Thus the individual's satisfaction will be dependent upon his or her relative level of performance rather than simply the process of learning.

It does not follow that adults will always use the more differentiated conception of ability. It has been pointed out (Nicholls, in press) that the more differentiated conception can serve no purpose for the individual whose goal is no more than improvement of mastery or attainment of a performance criterion that is not based on social comparison. In such situations the conception of ability as learning through effort is likely to be employed.

When, on the other hand, situational factors make individuals concerned about their personal competence, the conception of ability as capacity relative to that of others is "needed." Without this conception, one cannot distinguish the contributions to performance of one's ability from the effects of task difficulty and effort. Conditions predicted to induce use of this more differentiated conception include interpersonal

competition and presentation of tasks as measures of valued and scarce abilities such as intelligence.

In summary then, our aim was to see if individuals would employ these different conceptions of ability in the predicted circumstances and to see if feelings of satisfaction with or enjoyment of learning would also vary as predicted. In the general terms we introduced the paper with, the question was do effort, ability and learning have predictably different meanings and affective concomitants?

Study 1

This first study had the modest purpose of establishing which conception of ability mature individuals employ when explicitly asked to interpret the statement that someone is high in ability. The more differentiated conception enables a more adequate evaluation of personal competence -- distinguishing ability clearly from task difficulty and effort (Nicholls, in press, Nicholls & Miller, in press). It was, therefore, expected that this conception would be employed in this circumstance, despite the fact that concerns about own competence are not likely to be aroused.

Subjects. Twenty nine undergraduate educational psychology students participated in this study. Participation was voluntary and one group session was held.

Method. Each student received a two page questionnaire. On one page they were asked to interpret the target statement that "a person is highly able or extremely good at mathematics." A series of five possible interpretations were presented and

the students indicated the extent to which they agreed or disagreed with the statement on a seven-point scale. On the other page of the questionnaire students were asked to interpret the meaning of the following target statement: "A person performs extremely well in a mathematics course due to high interest and effort in the subject." Students then rated the same five potential interpretations that appeared on the first page. Order of pages and sequence of the five potential interpretations of the target statement were counterbalanced.

Results and Discussion. In order to determine how students interpreted each of the target statements, mean agreement ratings were computed for each interpretive statement and 95% confidence intervals were calculated. Mean ratings which were significantly different from the neutral point (4.0) were assumed to indicate agreement or disagreement. Mean ratings for each of the interpretive statements given the target statement concerning ability and the target statement concerning effort and interest are shown in Table 1.

Insert Table 1 About Here

When interpreting the statement that an individual has high ability in mathematics, students were most likely to agree ($p < .05$) that the person had above average ability for their age. Students' ratings of the statements concerning improvement of ability or understanding were not significantly different from the neutral point on the scale. Thus, when

specifically asked to focus on the idea of ability, students employ the more differentiated conception involving social comparison. High ability implies possessing greater capacity than others but not necessarily learning through effort.

On the other hand, when interpreting the statement concerning high performance resulting from interest and effort, students indicated significant agreement ($p < .05$) with interpretations concerning improved ability or understanding. In this case, students inferred learning or improvement from effort. They did not infer high ability. The mean rating of the statement concerning above average ability did not deviate significantly from the neutral point. Hence, students do not necessarily associate improvement or learning through effort with above average ability. This outcome is consistent with the more differentiated conception of ability wherein learning implies high ability only if others learn less with equivalent effort.

Further analysis of the data involved comparisons of the ratings for the two different target statements. Each of the five interpretive statements were analyzed by a 2(order) x 2 (sequence) x 2(target statement) analysis of variance with repeated measure on the last factor. Significant results are noted in Table 1.

As can be seen in Table 1, the analysis of variance results support the previous analysis. Students were more likely to interpret high ability as meaning above average ability ($F(1,25) = 37.10$, $p < .001$) while they were more likely to interpret the

high effort target statement as meaning improved understanding ($F(1,25)=43.48$, $p < .001$) or improved ability ($F(1,25)=23.18$, $p < .001$) through effort. However this latter difference (improved ability) was only significant for students who completed the page with the high ability target statement first (Order x target statement interaction: $F(1,25)=5.19$, $p < .04$). A similar interaction effect was found for the interpretive statement, "The person lacks mathematical ability, but compensates for this with effort." Students were more likely to disagree with this statement with reference to the high ability target statement if they evaluated the high ability statement first. Finally, for the interpretive statement "the person performs up to their potential," significant agreement was expressed given both target statements but the mean agreement levels did not differ significantly from each other.

In summary, student interpretations of statements that someone has high ability or that someone does well through effort appear to reflect the more differentiated conception of ability. "High ability" is taken to imply high ability relative to that of others, but not necessarily improved ability or understanding through effort. Learning through effort is not taken to imply high ability, but it is taken to imply improvement of ability or understanding. It seems, that as predicted, explicit questions about the meaning of ability and effort engage the more differentiated conception.

The only results that are a little difficult to interpret

are the interpretations of "performs up to potential." As can be seen in Table 1, in response to both target statements, students inferred that the person performed up to potential. This was an expected interpretation of the statement that someone does well through effort. It was not expected for the statement that someone has high ability.

Study 2

In this study we examined the hypothesis that different types of situational factors could lead the individual to adopt one conception of ability or the other. Although Study 1 indicated that students generally employ the capacity conception of ability, Nicholls (in press) has proposed that different situational factors can lead to the adoption of the less differentiated conception of ability. For example, when individuals become quite absorbed in an achievement task, learning becomes and end in itself. In this case the individual's goal really is improved performance and social comparison information is less relevant. This type of achievement orientation is referred to as task-involvement and is most likely to occur in settings where competition is minimized and the task represents an interesting and moderately difficult challenge. Here the less differentiated conception of ability is most likely to be engaged. In task-involvement, individuals are not self-aware and learning is an end in itself - it is inherently satisfying.

Conditions that make individuals concerned about their personal adequacy in skill situations (e.g. competition, presentation of a task as an intelligence measure) are most likely

to engage the concept of ability as capacity. Such conditions lead individuals to strive to demonstrate higher ability than others. We refer to this type of achievement orientation as ego-involvement. In ego-involvement, individuals are self-aware or self-evaluative and learning is a means to the end of demonstrating superior capacity. Under these conditions learning should only occasion satisfaction if it leads to clearly superior performance - beating others.

In this study we examined the effect of perceived achievement orientation (e.g. task-involvement or ego-involvement) on students' affective and cognitive interpretations of attributions of success to ability or effort. We expected that a task-involved orientation when contrasted with an ego-involved orientation would be associated with greater feelings of satisfaction with learning through effort.

Subjects. Eighty-five introductory educational psychology students participated in this experiment as part of a course requirement. The experiment was conducted with small groups of subjects ranging in size from eight to twenty.

Method. Each student received one randomly assigned questionnaire with a description on the first page of a hypothetical student who had succeeded in his chemistry course. There were two different scenarios, one describing a task-involved student and the other describing an ego-involved student. In the task-involved scenario we described a student who really loved to study science and spent his spare time conducting experiments. The ego-involved student was described as being concerned to have others view him as being extremely

smart in science. This individual was described as being highly competitive. In both scenarios the student had achieved an A in college chemistry -- tying for the 24th highest score in a class of 300. Our subjects were further told that the hypothetical student attributed his successful performance either to effort or ability.

We expected the attribution would differentially affect the perception of how the ego-involved and task-involved student would assess their abilities and satisfaction with learning. An attribution to high effort might be perceived to imply that the ego-involved student would feel his ability was undesirably low. Hence when the ego-involved student was described as attributing his performance to effort we expected subjects would rate him as less satisfied and as feeling less competent than when success was attributed to ability. For the task-involved student we expected the self-referent conception of ability to be most salient so that an attribution to effort would produce greater satisfaction and a higher assessment of ability than for the equivalent ego-involved student. After reading the scenario, subjects rated a series of statements describing how the student might feel about his performance. Ratings were made on a four-point scale ranging from "Not at All" to "Strongly."

Results and Discussion. Responses to questions were first analyzed by a 2x2 unweighted means analyses of variance, task-involved vs. ego-involved x attribution, ability vs. effort. No significant interactions were found for the questions of interest.

Since the response distributions tended to be skewed and in many cases the experimental groups did not have equal variances, all significant main effects were further analyzed separately using the chi-square statistic. Table 2 contains the group means and standard deviations for the questions of interest.

Insert Table 2 About Here

The results confirmed the hypothesis that perception of ego- versus task-involvement would lead to differences in anticipated affect. The ego-involved student was described as being less satisfied with his exam score, ($X^2_{(3)}$ =6.37, $p < .04$) more disappointed with the level of ability displayed ($X^2_{(3)}$ =18.24, $p < .0004$) and relieved to have done as well as he did ($X^2_{(3)}$ =16.38, $p < .001$) compared to the task-involved student. In addition, the task-involved student was expected to be more likely to feel he had improved his understanding of chemistry ($X^2_{(3)}$ =11.33, $p < .01$) and had performed up to his potential ($X^2_{(3)}$ =15.07, $p < .0005$). Thus our subjects expected the task-involved student to feel more positively about his learning and performance. Expected affect was not merely a function of causal attributions.

Our second hypothesis was, however, not confirmed. As noted above, there were no differential effects for the attributions depending on the achievement orientation (i.e., no significant interactions). However, there were some interesting differences in subjects' perceptions of the reactions of the hypothetical

students who attributed their performance to effort or ability. An attribution to effort was rated as leading the student to feel a greater sense of having learned a great deal ($X^2_{(3)}=22.32$, $p < .001$) and of having improved his understanding of chemistry ($X^2_{(3)}=19.52$, $p < .0002$) than an attribution to ability. Although these responses imply that the subjects expected that effort could produce some increase in ability, subjects seemed to feel that the limits of ability were being extended through effort. That is, subjects also expected that the student who attributed his performance to effort would be more likely to feel that he lacked outstanding ability but compensated through effort ($X^2_{(3)}=38.14$, $p < .001$). This was true for both the task-involved and ego-involved students. This result implies that students who attributed their performance to effort were perceived as having less ability than those who attributed their performance to ability. Our subjects seemed to be using the conception of ability as capacity regardless of the achievement orientation of the hypothetical student.

Our failure to engage the self-referent conception of ability could have resulted from ambiguity about the actual amount of effort exerted by the hypothetical student. In both the ego-involved and task-involved scenarios one might expect that the student studied pretty hard. However, when our subjects were given the information that the student attributed his successful performance to effort, the subjects may have interpreted this to mean more effort than others in the class.

In addition, the attribution was for a competitive performance - 24th highest score. This would be likely to invoke the norm-referenced, capacity conception of ability.

In order to overcome these shortcomings we designed a third study in which we did not explicitly describe any causal attribution on the part of the described actor. However, we did make explicit the amount of effort exerted.

Study 3

Subjects. One hundred fifty one introductory educational psychology students participated in this experiment. Group sessions were conducted ranging in size from 29 to 42.

Method. As in the previous study, subjects read a short scenario and then responded to a series of questions. However, in this study subjects were asked to imagine themselves as the subject of the scenario. In each scenario the subjects were asked to imagine that they were studying Italian and had passed the first test in the course. For the task-involved induction, subjects were to imagine that they were someone who really loved the culture of Italy and had long wanted to study the language. For ego-involvement, subjects imagined they were someone who really wanted to be a professor of Italian. Given the tight job market they knew they would have be first in their class to get such a job. Half the subjects in each group (High effort) were simply told that they had worked very hard and passed the first test. For the ego-involved high effort situation we also mentioned that classmates who also passed the test didn't have to work as hard. The other half

of our subjects (low effort) were told that they became ill and had to spend the rest of the week in the hospital. Hence they were unable to study as much as they had wanted to. Nevertheless, they passed the test. For the ego-involved low effort situation we further mentioned that classmates who also passed the test had studied harder.

After reading the scenario, subjects responded to a series of questions indicating how they would have felt about their performance. A seven-point rating scale was used.

Results and Discussion. Subjects responses were analyzed by a 2 (task- versus ego-involved) x 2 (high vs. low effort) unweighted means analysis of variance. Table 3 contains the means and standard deviations for each item. Subjects' ratings indicated that both high effort and task-involvement were likely to lead to feeling more delighted with what had been learned ($F(1,147)=16.77$, $p < .001$ and $F(1,147)=14.33$, $p < .001$ respectively) and a greater sense of improved competence ($F(1,147)=15.68$, $p < .001$ and $F(1,147)=6.92$, $p < .009$). These results are consistent with Study 2 in which a greater sense of improvement was also associated with both an effort attribution and task-involvement. In addition, when subjects rated how good they would feel they were at learning Italian, an interaction between effort and achievement orientation was found ($F(1,147)=28.09$, $p < .001$). The presence of high or low effort did not significantly affect this ability rating for task-involvement. However, for ego-involvement, high effort was associated with a lower ability rating than was low effort.

Although the ratings for task-involvement were not significantly different, the means were in the direction of a higher rating for the high effort condition. Thus the conception of ability as capacity was only employed in the ego-involved situation where the individual was highly competitive.

The experiment demonstrates that our subjects expected the impact of high perceived effort on an individual's reaction to his success to be dependent upon personal goals and the meaning of the situation for the individual. The cognition that higher effort can imply lower ability even when it leads to more learning could influence the amount of effort an individual devotes to the same task in the future (Covington & Beery, 1979). In a highly competitive setting a student may feel he will appear to be more able by exerting little effort than by trying hard.

General Discussion

The results of these studies indicate that the distinction between the two conceptions of ability and ego- versus task-involvement may further clarify achievement motivation research. These distinctions might, for example, explain the paradoxical finding that high resultant achievement motive individuals infer they have higher ability when they succeed after having applied high rather than low effort whereas low motive individuals infer higher ability when they apply lower effort (Touhey & Villemez, 1980). The high motive subjects' inferences are consistent with the description of task-involved individuals for whom success implies higher ability when higher effort is applied. They may have been sufficiently confident of their ability to have not become ego-involved.

They may have focussed on what they achieved through effort rather than on how the fact that they applied high effort might reflect on how their capacity compared with that of others. The low resultant motive subjects would be more likely to doubt their capacity and become consciously self-evaluative. This could explain why their inferences mirror the description of ego-involvement where success implies higher ability when less effort is employed.

Diener and Srull (1979) report data on a related phenomenon. They found that the induction of self-awareness produced self-reinforcement on the basis of peer performance norms. Satisfaction with performance occurred when the peer norms were surpassed and dissatisfaction occurred when they were not reached. Performance norms, however, had little impact when self-awareness was not induced. In this instance, subjects self-reinforced on the basis of their own previous performance. Similar findings were obtained in two studies by Scheier and Carver (Note 1). Though not dealing with effort and ability, these results support the general hypothesis that judgments of ability or feelings of competence may reflect different conceptions of competence in different situations. The meaning of competence or ability is not fixed.

In conclusion, it seems that we need to be more sensitive to the possibility that terms like ability can have different meanings to the individual in different contexts. We cannot assume that we always know what our subjects mean when they attribute success to high ability or high effort. In addition, we cannot assume that the perception of high effort or high ability will always have the same evaluative or affective significance. Researchers have asked questions such as which attributions produce the most

pride or shame or which emotions are associated with which attributions (e.g., Covington & Beery, 1976; Nicholls, 1976; Weiner, Russell & Lerman, 1978, 1979). Perhaps instead, we need to ask, how will circumstances alter these relationships.

Reference Note

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Table 1

Interpretations of Descriptions of Ability and Effort:

Mean Levels of Agreement* with Five Possible Interpretations

Interpretive Statements	Person Has High Ability		Person Succeeds With High Effort
The person has above average ability for their age.	2.24[b] (1.09)[a]	c	3.86 (1.46)
The person performs up to their potential.	2.97[b] (1.40)		2.38[b] (1.21)
The person lacks mathematical ability, but compensates for this with effort.	5.90[b] (.98)	c d	4.48 (1.72)
The person improved their math ability through effort.	3.72 (1.81)	c d	2.10[b] (1.45)
The person improved their understanding of the subject through effort.	3.90 (1.80)	c	1.62[b] (.94)

*Ratings were made on a seven-point scale (1=Strongly Agree, 4=Neutral, 7=Strongly Disagree)

[a]Numbers in parentheses represent standard deviations.

[b]Mean rating significantly different from neutral point of 4.0 ($p<.05$).

[c]Significant difference between mean rating for ability and effort ($p<.002$).

[d]Significant interaction between order of rating and condition: ability versus effort ($p<.04$).

Table 2

Study 2: Mean Ratings* of Questionnaire Items by Experimental Groups

Questionnaire Items	Attribution: (N)	Achievement Orientation: Task-Involved Ability (21)	Task-Involved Effort (20)	Ego-Involved Ability (22)	Ego-Involved Effort (22)
He would feel satisfied with his exam score.		3.50 (.60)[a]	3.64 [b]	3.10 (.70)	3.40 (.50)
He would feel disappointed with the level of ability he had shown on the exam.		1.55 (.88)	1.18 [b]	2.33 (1.07)	1.95 (.76)
He would feel relieved to have done as well as he did.		1.77 (.92)	2.23 [b]	2.57 (1.03)	3.10 (.72)
He would feel he had really improved his understanding of chemistry.		3.27 (.88)	3.86 [b] [c]	2.81 (.75)	3.65 (.49)
He would feel he had performed up to his potential.		3.64 (.58)	3.68 [b]	3.24 (.44)	3.45 (.51)
He would feel he had learned a great deal about chemistry.		3.45 (.74)	3.95 [c]	3.33 (.73)	4.00 (.00)
He would feel he lacks outstanding ability but compensates through effort.		1.55 (1.01)	2.95 [c]	1.38 (.67)	3.20 (1.01)

*Ratings were made on a four-point scale (1=Not At All, 4=Strongly).

[a]Numbers in parentheses represent standard deviations.

[b]Statistically significant effect for achievement orientation.

[c]Statistically significant effect for attribution.

Table 3

Study 3: Mean Ratings* of Questionnaire Items

by Experimental Groups

Questionnaire Items	Achievement Orientation: Task-Involved		Ego-Involved	
Effort: (N)	High (32)	Low (35)	High (42)	Low (42)
You would feel delighted with what you had learned.	6.41 (.87)[a]	5.17 [b c] (1.54)	5.24 (1.61)	4.45 (1.64)
You would feel you had improved your competence in Italian.	5.91 (1.44)	5.23 [b c] (1.48)	5.48 (1.04)	4.50 (1.29)
You would feel you are good at learning Italian.	5.75 (1.16)	5.17 [b c d] (1.32)	4.10 (1.41)	5.64 (.96)

*Ratings are on a seven-point scale (1=Definitely Not, 4=Neutral, 7=Definitely So).

[a]Numbers in parentheses represent standard deviations.

[b]Statistically significant effect for Achievement Orientation.

[c]Statistically significant effect for Effort.

[d]Statistically significant interaction between Achievement Orientation and Effort.